

Comparative Analysis between Online and Physical Assessments & Learning among Medical Students of University of Cyberjaya in 2022

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Abstract:

The COVID-19 pandemic has taken a toll on the teaching and learning process. We were forced to shift towards a remote style of learning, connected by means of electronic gadgets and internet. However, a new change brings new challenges, especially in the field of medicine where a huge core of our teaching is done in the hospital with real life patients. The main aim of our research is to investigate what medical students have to say regarding the new method of online teaching as compared to the traditional face-to-face style of learning.

Keywords: Online class, Physical class, Medical student, Challenges

CHAPTER 1

INTRODUCTION

1.1 Background

It is without a doubt that the recent pandemic of corona outbreak in 2019 had a huge impact on our lives. One of the major changes is the learning system has switched from physical (face-to-face) classes to virtual paradigm, also known as online learning. Physical class refers to the traditional style where students and teachers gather in a classroom for teaching and learning purposes, while online class refers to a remote style learning where the students and teachers connect through an online platform on their respective electronic devices (Jain, 2020). A study conducted in Pakistan revealed the advantages of online learning which are flexibility and student-centered learning. This remote style of learning enables students to learn from home with the help of gadgets and platforms that are easily accessed (Mukhtar, Javed et al. 2020).

Despite the fact, medical schools curriculum comprises lectures on basic sciences and clinical practices for hands-on experience. One of the respondents said “online classes proved to be beneficial for theoretical subjects like basic sciences, but not for clinical skills etc.” in a study that was conducted in Saudi Arabia (Khalil, Mansour et al. 2020). One of the issues that may arise is whether the current group of undergraduates will be of the same quality as the generations before them. Are they getting sufficient training to prepare them for what lies ahead? Learning medical procedures by watching videos may help

give an insight on what is happening but without any practice on the proper technique, these students might have trouble performing the procedures later on. A third year medical student from John Hopkins University stated that physical examinations cannot be fully experienced virtually (Weiner, 2020).

In Malaysia, there is not much study being done on the challenges faced by medical students since the introduction of online learning. Therefore, this study aims to compare the differences between online learning and physical learning in medicine, based on the perception of the medical students of University of Cyberjaya.

1.2 Research Question

Is online learning more challenging for students in comparison to physical learning methods?

1.3 Research Objectives

1.3.1 General Objective

Investigate the disparity between online and physical learning among medical students in University of Cyberjaya in 2022.

1.3.2 Specific Objectives

1. To determine the perception of students towards the preparation and conduct of examinations via online and physical methods.
2. To determine the perception of students towards online and physical learning methods.
3. To investigate the relationship between student satisfaction in online and physical learning.

1.4 Research Hypothesis

1. Null : There is no differing perception of students on online learning and assessments in comparison to physical methods
2. Alternate : There is a differing perception of students on online learning assessments in comparison to physical methods

CHAPTER 2

LITERATURE REVIEW

2.1 Challenges, Effectiveness and Perceptions of Online Learning

Handaya et al. (2021) conducted a cohort study, which divided the participant into two groups: the experimental group(n=53) and the control group(n=42). In the experimental group, they were ordered to watch a surgical knot video before the task was given, while the control group will do the first task watching no videos prior to it. Each of the participants made a surgical knotting video before attending an online class with an instructor to guide them. The result showed the experimental group scored higher than the control group with a significant difference of $P < 0.001$. However, after joining the class, there were no significant differences between the groups $P = 0.706$. This study revealed that the online videos, simultaneously with online class, gave optimal teaching systems to learn basic surgical knotting during the pandemic.

A cross-sectional study by Elshami W et al. (2021) from April to May 2020 was conducted to identify the

factors that contribute to students and faculty satisfaction towards online learning. The sample size of the students from the medical and health sciences colleges was $n=370$, while the number of faculty involved in this study was $n=81$. There were two different questionnaires whereby the students needed to answer students' satisfaction questionnaires comprise 24 items on various aspects prepared by Bolliger and Halupa [1]. The Online Instructor Satisfaction Questionnaire by Bolliger and Wasilik [2] was used for the faculty. There were 358 responses from the students, 68.7% were less satisfied with online learning but for other aspects, 60.9% found that the communication between students and lecturers was good. The time taken to download the learning material was the challenge faced by the students, $n=126$ (35.2%). 44 out of 71 responses from the faculties were satisfied with the online method as compared to face-to-face. Some of them agreed that the number of workloads (97.1%, $n=68$) and the time needed to prepare the educational materials (91.4%, $n=64$) as well Internet issues and technical difficulties (85.8%, $n=60$) were the areas that affect their satisfaction for online learning.

Dost S, Hossain A, Shehab M, et al. (2020) did a cross-sectional study to get an overview of the perceptions of medical students in the UK towards online learning as a teaching method during the pandemic. This study involved 2721 participants from 39 out of 40 medical schools in the UK. The students needed to answer a set of questionnaires divided into certain areas, including their details, perceptions, and experiences in online classes. They ranked their perceptions on a Likert scale and most of them found they had a minimal chance of asking questions. Hence, the students did not find online learning to be interesting or satisfying. Some of them experience difficulties like family distractions (26.76%), internet issues (21.53%), and anxiety (11.08%). Being able to feel more flexible (19.52%), comfortable (15.84%), cost savings (14.24%) were the good sides of online learning perceived by the students.

The aim of this descriptive quantitative study by Menon U et al. (2021) is to evaluate the medical students' level of satisfaction of an online teaching-learning programme. 400 students were involved in the study (including 30 subjects in the pilot study). They divided the questionnaire, which comprises 20 items into 4 sections. 2 questions were about their knowledge before joining the online classes, 13 questions regarding their perceptions, 3 questions related to online assessment, 2 about future plans and suggestions. All questions are mandatory and need to be answered within 2 weeks. The study was conducted with 95% confidence and to compare between the two groups chi-square test was used. Based on the scale rating of overall satisfaction, the majority scored moderate with a percentage of 53.6% followed by a high level of satisfaction, 31% and 15.4% scored low satisfaction.

Kaur N, Dwivedi D, Arora J, et al. (2020) organized a cross-sectional study from 10 to 18 April 2020 involving 983 medical graduates. The purpose of this research was to rank the level of satisfaction and efficiency of online methods compared to traditional systems carried out before covid-19. The students were given a set of questionnaires consisting of several criteria on the effectiveness and satisfaction of the online classes. There were 4 parameters where the students found much less and somewhat less effective. Offering convenience (53.4%), interaction level (62.8%), individual learning needs (48.9%), balancing of practical and theoretical knowledge (72.3%). In conclusion, online classes were a good supplement for traditional methods but not a suitable way to substitute the conventional systems. Dodiya et al. also concluded that hybrid learning could avoid limitations in online learning.

The study was conducted from 1st Nov 2019- 31st July 2020(Ahmed & Reddy, 2021) with the aim to identify the most preferred methods of learning methods provided by the faculty. There were 89 medical students from 4th and 5th year involved in the study. Students who are unwilling to be in the study or give incomplete responses to the questionnaire will be excluded from the investigation. A questionnaire comprising 11 questions was given to the students. Questionnaires that have been answered completely were analyzed in the Statistical Package for Social Sciences. Based on the analyzed questionnaire, the most preferred learning method was bedside teachings (76.4%) followed by lectures (14.6%). Majority of the students prefer practicing skills with a real patient (94.4%) over practicing on mannequin/simulated patients (5.6%).

2.2 Student Satisfaction and Performance in Online Learning and Physical Learning

A study conducted by J.P Girard et al. 2016 looked at test scores of students across 10 sections which is a total of 5 semesters. A total of 82 test scores of students who sat for online examinations and 84 test scores for students who sat for face to face examinations were obtained. They were then analyzed using a one way anova test. Test results revealed that there were no significant differences between the test scores. A two sample t test was also done, which revealed that there were no significant differences between the level of assessment scores between online and face to face examinations.

Another study was conducted by Ram Gopal et al in 2021 with an aim of determining the factors that affected student satisfaction in online learning. The study looked at 4 prime factors and how these affect student satisfaction and subsequently their performance. These factors were quality of instructor, course design, prompt feedback and expectation of students. Results obtained indicate that instructor’s quality has a positive relationship with the satisfaction of students for online classes (SE = 0.706, t-value = 24.196; $p < 0.05$). Indicative of a supportive factor. The second factor is course design, is also supportive with results of (SE = 0.064, t-value = 2.395; $p < 0.05$). The third factor is Prompt feedback, and results show that feedback has a positive relationship with the satisfaction of the students (SE = 0.067, t-value = 2.520; $p < 0.05$). The fourth factor is students’ expectations. The results show a positive relationship between students’ expectation and students’ satisfaction with online classes (SE = 0.149, t-value = 5.127; $p < 0.05$). It was concluded that the most impactful factor was the quality of instructor with a SE:0.706,t-value=24.916; $p < 0.05$.

2.3 Conceptual Framework

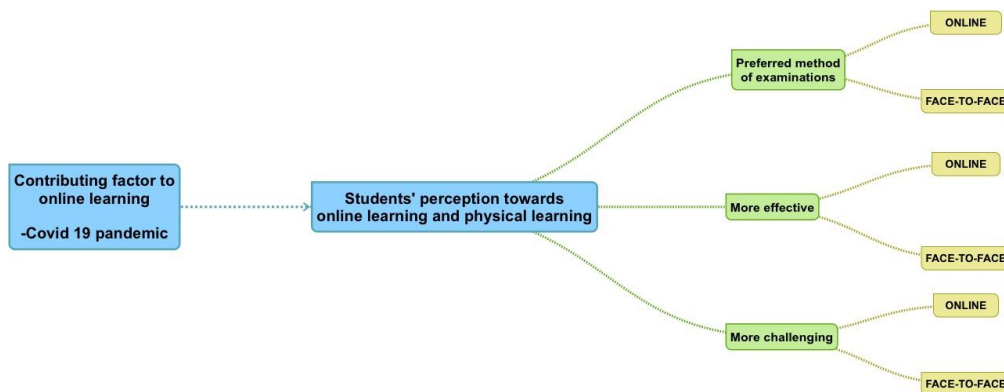


Figure 1. Conceptual framework on students' perception of online and physical learning.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Method

3.1.1. Study Design

The study design that will be used for this study will be Cross Sectional Study

3.1.2. Study Location

The study will be conducted at the University of Cyberjaya. The university currently has over 3500 students who are enrolled in more than 30 programmes ranging from degree to postgraduate research courses in a number of areas.

We have specifically chosen this location for our study since it has an abundance of our target participants who are the undergraduate MBBS students. It has also become our sole study location since there would be less variables for us to take into account, such as the online assessment platforms on which the students took their examinations from.

3.1.3. Duration of Study

August to December 2022

3.1.4. Sample Population

All students in University of Cyberjaya

3.1.5. Sampling Frame

All University of Cyberjaya students from Faculty of Medicine (MBBS)

3.1.6. Sample Participants

All Bachelor of Medicine and Bachelor of Surgery (MBBS) students in University of Cyberjaya based on the inclusion and exclusion criteria

1. Inclusion

- University of Cyberjaya MBBS students
- Year 3/4/5 academic year 22/23
- Have experienced online class
- Able to understand English

2. Exclusion

- Students who do not own any gadget to answer the questionnaire

3.1.7. Sample Size

Sampling size will be calculated using the formula of single proportion. The formula is as per below;

$$n = \left[\left(\frac{Z}{m} \right)^2 \times P(1 - P) \right] + 10\%$$

n = sample size,

Z score, z = 1.96 (95%)

Margin of error; m = 7% (0.07)

Proportion, p = Prevalence from previous study

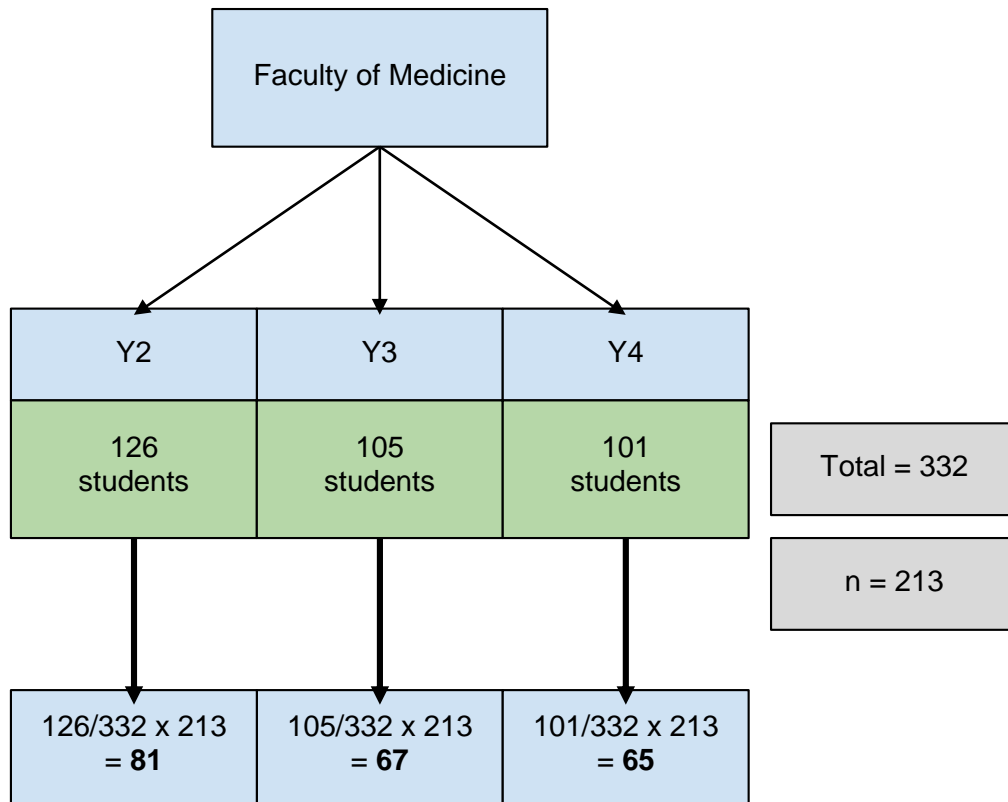
Table 3.1.7.1. : Calculation of Sample Size

Prevalence	P	1-p	n
Prevalence and Determinants of Students' Perception on Online Learning among Polish Medical Students was 0.46 (Baczek, Szpringer et al. 2020)	= 0.46	(1-0.46) = 0.54	$n = [(1.96/0.07)^2] \times (0.46 \times 0.54)$ $n = 194 + 10\%$ n = 213

3.1.8. Sampling Method

Stratified random sample

This method is used as we will divide the population into groups. Students from the faculty of medicine who fulfill the criteria to participate will be divided according to their year of study. The number of students chosen are determined by proportion based on the study sample size.



A total of 213 students will be included in the study. 81 students from second year, 67 students from third year and 65 students from fourth year from which we used convenience sampling to achieve the target amount of each year respectively.

CHAPTER 4

RESULTS

4.1. General

Overall, 227 respondents completed the questionnaires, which makes up more than 100% of the targeted response rate (n=213).

4.1.1 Sociodemographic of study participants

Sociodemographic characteristics	Frequency, n	Percentage, %
Year of study		
3	81	38.0%
4	67	31.5%
5	65	30.5%
Gender		
Female	127	59.6%
Male	86	40.4%
Race		
Malay	125	58.6%
Chinese	22	10.1%
Indian	53	25.1%
Others	13	6.2%
Number of people in the same household		
1-2	22	10.3%
3-4	81	38.0%
≥5	110	51.6%
Housing area		
Urban	183	85.9%
Rural	23	10.8%
Overseas	7	3.3%
Internet access		
Wi-Fi	179	84.0%
Mobile data	34	16%

Quality of internet connection		
Good	192	90.1%
Poor	21	9.9%

Table 4.1.1 shows that respondents were mostly from year 3 (38.0%), female (59.6%), Malay race (58.6%), with five or more people in a household (51.6%), live in urban housing area (85.9%), using Wi-Fi (84.0%) as internet access and have good quality of internet connection (90.1%).

4.2 Tendency to lose focus

4.2.1 Table comparison of tendency to lose focus between online and physical class

Year of study		Higher tendency to lose focus during class.		Total
		1	2	
3	Count	19.000	62.000	81.000
	% within row	23.457%	76.543%	100.000%
4	Count	3.000	63.000	66.000
	% within row	4.545%	95.455%	100.000%
5	Count	1.000	64.000	65.000
	% within row	1.538%	98.462%	100.000%
Total	Count	23.000	189.000	212.000
	% within row	10.849%	89.151%	100.000%

$X^2 = 21.849, p < 0.001$

Table 4.2.1 shows 89.15 % of the students from year 3,4, and 5 have a higher tendency to lose focus in online class as compared to physical class.

4.3 Preferred style of study

4.3.1 Table comparison of preferred style of study between online and physical

Year of study		Preferred style of study.		Total
		1	2	
3	Count	74.000	7.000	81.000
	% within row	91.358%	8.642%	100.000%
4	Count	50.000	17.000	67.000
	% within row	74.627%	25.373%	100.000%
5	Count	48.000	17.000	65.000
	% within row	73.846%	26.154%	100.000%
Total	Count	172.000	41.000	213.000
	% within row	80.751%	19.249%	100.000%

$X^2 = 9.473, p = 0.009$

Almost 81% of the medical students preferred face to face study sessions and it is statistically significant with p value=0.009.

4.4 Quality of learning (theory and practical)

4.4.1 Table comparison of quality of learning (theory and practical)

Year of study		Quality of learning (theory and practical)		
		1	2	Total
3	Count	75.000	6.000	81.000
	% within row	92.593 %	7.407 %	100.000 %
4	Count	57.000	10.000	67.000
	% within row	85.075 %	14.925 %	100.000 %
5	Count	55.000	10.000	65.000
	% within row	84.615 %	15.385 %	100.000 %
Total	Count	187.000	26.000	213.000
	% within row	87.793 %	12.207 %	100.000 %

$X^2 = 2.816, p = 0.245$

Approximately 88% of the students from year 3,4 and 5 agree that physical class offers better quality of learning (theory and practical) than online class. However, this is not statistically significant with p value=0.245.

4.5 Examinations suit all forms of examination tools (SBAQ, SAQ, MEQ, OSPE, OSCE)

4.5.1 Table comparison of examinations suit all forms of examination tools (SBAQ, SAQ, MEQ, OSPE, OSCE)

Year of study		Examinations suit all forms of examination tools (SBAQ, SAQ, MEQ, OSPE, OSCE)		
		1	2	Total
3	Count	76.000	5.000	81.000
	% within row	93.827 %	6.173 %	100.000 %
4	Count	64.000	3.000	67.000
	% within row	95.522 %	4.478 %	100.000 %
5	Count	60.000	5.000	65.000
	% within row	92.308 %	7.692 %	100.000 %
Total	Count	200.000	13.000	213.000
	% within row	93.897 %	6.103 %	100.000 %

$X^2 = 0.596, p = 0.742$

Around 94% students from year 3,4 and 5 answered that physical examinations suit all forms of examination tools (SBAQ, SAQ, MEQ, OSPE, OSCE). The result, however, is statistically insignificant with p value=0.742.

CHAPTER 5 DISCUSSION

There is without a doubt a clear difference in both physical and online learning with each posing its own set of challenges. Online learning allows students to be in the comfort of their own home which can contribute to increased productivity and creativity but also allow for more procrastination dependent upon a variety of other factors. Saminullah et al. concluded in her study that the most common problem faced by medical students during online classes is family distraction (26.76%). In his study online Learning satisfaction, Wiam Elshami et al. discovered that 68.7% out of 358 students who participated in the study were unsatisfied with online learning due to problems with downloading learning materials.

From our study we were able to conclude the majority of students, specifically students from year 3 to year 5 preferred the face to face learning modalities over online learning. This is evident with the chi square analysis showing a significant p values of 0.001,0.036,0.001 and 0.009 for questions such as higher tendency to lose focus,examinations are more stressful,ease to cheat during examinations and preferred style of study respectively. The following results are a prime indicator of why students prefer face to face learning and examination over online modalities.

However, it is not to be overlooked that there are some differing perceptions in certain scenarios for students in the comparison between learning and examinations for online and physical modalities. For questions such as convenience and flexibility of exams, students have mixed views across year 3,4 and 5 students with a reported p value of 0.285. Thus, it is unjustifiable to say that students have a clear differing perception between online and physical modalities with a favor towards physical as it can be differing in certain basis such as for the research question above.

In a study conducted by J.P. Girard et al. 2016 looked at test scores of students across 10 sections which is a total of 5 semesters. A total of 82 test scores of students who sat for online examinations and 84 test scores for students who sat for face to face examinations were obtained. They were then analyzed using a one way anova test. Test results revealed that there were no significant differences between the test scores. A two sample t test was also done, which revealed that there were no significant differences between the level of assessment scores between online and face to face examinations.

Online learning offers flexibility in terms of when and where students can access course materials and lectures. This is particularly beneficial for medical students who might have irregular schedules due to clinical rotations or other commitments. Students can access course content and resources from anywhere, which can be advantageous for those who are not able to attend physical classes as University of Cyberjaya has multiple teaching hospitals for different fields of medicine. Online platforms often allow for self-paced learning, enabling students to review complex topics at their own speed and revisit materials as needed. Online learning can incorporate multimedia resources like videos, interactive simulations, and virtual anatomy models, enhancing the understanding of complex medical concepts.

On the other hand, physical learning accommodates practical skills and hands-on training, which are best facilitated in physical labs, clinical settings, and simulation wards. Physical learning provides immediate interaction with instructors and peers, allowing for real-time discussions, clarification of doubts, and spontaneous questions. Classroom settings offer structure, routine, and a focused learning environment, contributing to better time management and study habits. Physical learning enables students to observe real clinical scenarios, patient interactions, and medical procedures, which are fundamental to medical training. In-person learning fosters networking opportunities, teamwork, and collaboration, all of which are valuable skills for medical professionals.

Online and physical learning modalities poses its own set of challenges and threats, for example physical classes in the current day and age since the covid pandemic carries the concerns of possible increased infection rates and outbreaks. Online classes on the other hand prevents hands-on medical training, which can be challenging to replicate effectively in an online environment.

CHAPTER 6 CONCLUSION

Both ways of learning have their risks and benefits, to which we need to adapt to be able to fully optimize the learning productivity. Physical classes offer better practical learning such as clinical skills training (CST) or even laboratory work. Online classes hold the advantage of flexibility whereby the students and teachers can meet from their own comfortable space. On the contrary, the outbreak of diseases looks to be a huge threat to traditional face-to-face sessions and the lack of hands-on experience during online classes seems to deteriorate students' performances and understanding.

Our study clearly showed that the troubles faced by medical students in University of Cyberjaya during online classes were multifactorial – internet connection, easily distracted, losing focus etc. Although the learning opportunities provided through physical classes are undeniably helpful for the students, we do believe that online classes can and should be considered in this day and age, provided with the right ways of teaching and learning processes. For instance, theory learning, presentations or quizzes can be done online, while practical sessions or examinations can be conducted physically. It would be more convenient for both parties, students and lecturers as they do not necessarily have to commute to campus everyday. This would help them save the most valuable currency, which is time.

The challenges faced during online classes can be easily overcome via a more interactive session like smaller groups of students so that the lecturer can easily engage with the students to avoid them from losing focus. Students should also put in more effort to avoid distractions while being at home like locking themselves in a private room during online sessions. If students can gain the full benefits from both physical and online classes, they will prosper more.

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APPENDICES

Appendix A: Respondents Information and Informed Consent

Summative examinations in the online mode; what do medical students have to say?

1. Name of Investigator :

- a. Dr. Norfaizatul Shalida Omar
- b. Danial Luqman bin Ashraf
- c. Aina Mardhiah binti Kamaruddin
- d. Nur Nabihah Saadah binti Mohd Nasri
- e. Rubbendra A/L Paramasivam

2. **Institution:** University of Cyberjaya

3. **Sponsor:** This study does not receive any external funding.

4. Introduction:

It is critical that you understand why the research is being conducted and what it will entail. Please take your time reading through and considering this information before deciding whether or not to participate. Inquire with the study staff if anything is unclear or if you require additional information. You must sign this informed consent form once you are satisfied that you understand this study and wish to participate. Your participation is voluntary. You do not have to be in this study if you do not want to. You may withdraw from it at any time once you wish to volunteer in this study. If you withdraw, any data collected from you up to your withdrawal will still be used for the study.

This study has been approved by the University of Cyberjaya Research Ethics Review Committee (CRERC).

5. **Purpose of study:** You have been invited to the study because you are a UOC MBBS undergraduate student from year 3-5 as you have been exposed to the online teaching method ever since the first MCO.
6. **Structure of the questionnaire:** There will be a total of 5 sections in this questionnaire, including this section (Informed Consent Sheet) .Section 2 will be on requirements question only. Section 3 will be on Demographic Information, consisting of 8 short questions. Section 4 will be on online exam preparation and conduct with 19 questions consisting of Strongly Disagree/ Disagree/ Neutral/ Agree/ Strongly Agree items. Finally, section 5 will be about general perception towards physical class and online class, with 15 questions consisting of Physical class/ Online class items.
7. **Potential risks and side effects:** Risk of participation in this questionnaire is rather minimal or non-existent.
8. **Benefits:** There may or may not be any benefits to you. Information obtained from this study will help improve our understanding on said topic and may play a role in identifying and confirming the challenges faced by students of UOC in online learning and assessments. Recognition and awareness of these issues within the educational industry allows more people to provide solutions thus increasing the efficiency of online learning.
9. **Confidentiality:** All information obtained through this study will be kept and handled confidentially in accordance with applicable laws and/or regulations. Your identity will not be revealed without your express consent when the study results are published or presented. Individuals involved in this study, qualified monitors and auditors, and governmental or regulatory authorities may inspect study data as needed.
10. **Contact: Should you have any inquiries please contact:**
 - a. **Danial: 019-4422399**
 - b. **Aina: 010-6536373**
 - c. **Nabihah: 018-2813446**
 - d. **Rubben: 012-332 5252**

INFORMED CONSENT FORM

By agreeing below, I confirm the following:

- I was given written information for the above study and read and understood it.
- I was given enough time to think about participating in the study and had the opportunity to ask questions, and all of my questions were satisfactorily answered.
- I understand that my participation is entirely voluntary, and that I may withdraw from the study at any time without explanation, and that this will have no bearing on my future treatment. I am aware of the risks and benefits, and I freely consent to participate under the conditions stated. I understand that I must follow the investigator's instructions regarding my participation in the study.
- I understand that study staff, qualified monitors and auditors, the sponsor or its affiliates, and governmental or regulatory authorities will have direct access to my record to ensure that the study is

carried out correctly and that the data is recorded correctly. All personal information will be treated as STRICTLY CONFIDENTIAL.

- I have the option of receiving a signed and dated copy of this subject information/informed consent form to take home.

Do you agree to participate in this study and answer the questionnaire? (Yes / No)

Requirements:

- UOC MBBS students
- Year 3/4/5 academic session 22/23
- Have experienced online class

Appendix B : Questionnaire

Summative examinations in the online mode; what do medical students have to say?

Survey instrument

Online exam preparation and conduct:

	Statements	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1	Preparing the gadgets/laptops/phones/i-pads takes a lot of time before appearing for online examinations.					
2	Adequate instructions are given prior to online examinations.					
3	I have more time to answer in online examinations.					
4	I am distracted while taking online examinations rather than paper-based traditional exams.					
5	Online examinations have the drawback of lack of comfortable physical space.					
6	Cheating is difficult during online exams.					
7	I am satisfied with my answers in online examinations.					
8	Poor internet access is the biggest threat to online examinations.					
9	I always feel anxious when I take online examinations.					

10	I have difficulty submitting my answers in online examinations.					
11	There is a fear of missing submitted answers during online examinations.					
12	Poor computer soft-skills hinder performance in online examinations.					
13	I have difficulty in arranging two views for online exam invigilation.					
14	I feel intrusion of my privacy during online exam invigilation.					
15	My typing speed is slow while answering online examinations.					
16	Financial difficulties which disable using high speed internet hinder online examinations.					
17	The invigilators trouble-shoot and provide support if I encounter any problem during online examinations.					
18	Inability to access washrooms during online examinations makes me uncomfortable.					
19	Seeing the amount of time left to complete the online examination makes me progress better.					

General perception towards Physical class and Online class

	Statements	Physical class	Online class
1	Quality of learning (theory and practical)		
2	Provide motivation to learn the subject matter.		
3	Higher tendency to lose focus during class.		
4	Demonstration on clinical skills (OSCE, OSPE)		

5	Better suited with formative assessments (eg: presentations, quizzes, group video project)		
6	Better suited with summative assessments (eg: final examinations)		
7	Examinations enhance self-learning.		
8	Examinations are suitable for all years of study.		
9	Examinations are suitable for all levels of students.		
10	Examinations suit all forms of examination tools eg: SBAQ, SAQ, MEQ, OSPE and OSCE.		
11	Examinations are more stressful		
12	Examinations are convenient and flexible.		
13	Examinations are easier		
14	Easier to cheat during examination		
15	Preferred style of study		

Appendix C : Operation Definition

Variables	Operation Definition
Physical class	Physical class refers to the traditional style where students and teachers gather in a classroom for teaching and learning purposes (Jain, 2020)
Online Class	A remote style learning where the students and teachers connect through an online platform on their respective electronic devices (Jain, 2020)
SBAQ	Single Best Answer Question
SAQ	Short Answer Question
MEQ	Modified Essay Question
OSPE	Objective Structured Practical Examination
OSCE	Objective Structured Clinical Examination

Appendix D: Gantt Chart

YEARS	2021				2022								2023											
	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
PROPOSAL PREPARATION	█	█	█	█	█																			
PROPOSAL PRESENTATION						█																		
PROPOSAL CORRECTION						█	█																	
ETHICAL APPROVAL								█	█	█														
QUESTIONNAIRE PRE-TEST AND CORRECTION										█	█													
DATA COLLECTION AND ENTRY												█	█	█	█	█								
DATA ANALYSIS																	█	█	█	█	█			
REPORT WRITING																						█	█	█
REPORT SUBMISSION																								█